

## Mineral Resources

### Background

Mineral resources in the Bristol Bay planning area include metallic base, precious, platinum-group, rare earth, and the industrial rocks and minerals. The minerals occur in a wide range of deposit types. The metallic mineral deposits can be divided into placers and lodes.

Almost all state land within the planning area is managed for multiple use and is open to mining. The state selected much of the land in the planning area because of its mineral potential, as well as its potential for oil and gas, agriculture, and its recreation and wildlife values. Exploration and development of mineral resources involves considerable investment of time and monetary resources. A small fraction of prospects that are investigated actually result in identification of a site that is economic to develop. If a deposit proves economic for development, state and federal regulations and additional stipulations determined through the permitting process, will ensure that other resource values are protected.

The area has not been a significant producer of placer gold, compared with other areas of the state. The most significant placer gold district is the Nyac district, located in the extreme northwest portion of the planning area. The district has produced approximately 500,000 ounces gold and active placer mining continues to the present; due to the number of placers at Nyac, it is speculated that significant lode sources may be present. Placer gold has also been produced as a byproduct or co-product from the platinum placers in the Goodnews district. This district has produced a significant amount of platinum and for many years was the only domestic platinum producer in the U.S. The area has been the focus of a number of exploration programs to locate the lode source or sources of the platinum and gold. Some consider the tide and submerged lands to contain significant additional reserves of platinum and gold. Lastly the Bonanza Hills area has produced a modest amount of placer gold from reworked glacio-fluvial deposits.

Lode deposits of the area can be divided into several deposit types: 1) mesothermal gold deposits<sup>15</sup>, 2) epithermal gold deposits<sup>16</sup>, 3) porphyry copper<sup>17</sup> systems with related skarns<sup>18</sup>, 4) magmatic segregation deposits, and 5) greisens<sup>19</sup>. The most significant mesothermal gold system found to date is perhaps that in the Shotgun Hills; a drill indicated resource of

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<sup>15</sup> Gold deposit formed at intermediate depths and temperatures; commonly with good continuity and a distinct alteration sequence.

<sup>16</sup> Precious metal deposits formed at shallow depths and formed at low temperatures; commonly in volcanic terranes.

<sup>17</sup> Large tonnage and low-grade copper deposits associated with granitic plutons; gold, silver, and molybdenum commonly occur as byproducts or co-products.

<sup>18</sup> Deposits formed in the wall rocks adjacent to a pluton such as a granite.

<sup>19</sup> An altered granitic rock composed of quartz and mica (muscovite) and rich in fluorine; usually associated with tin and topaz.

approximately one million ounces has been estimated. Epithermal gold deposits can be divided into two separate types based on location and associated pathfinder elements. A group of mercury-gold epithermal deposits occurs in a wide belt trending northeast in the uplands areas west of the Nushagak basin. The other epithermal system is of a low-sulfur, gold-silver dominant variety that occurs in Tertiary and younger volcanic rocks on the Alaska Peninsula. The porphyry copper deposits consist of intrusive related copper±molybdenum±gold±silver systems and associated skarn (wall rock-hosted) deposits with base and precious metals. These are part of a complex magmatic terrane which extends down the Alaska Peninsula; many prospects are known. The most significant and well documented of these deposits is the Pebble Copper deposit, 19 miles northwest of Iliamna, which is currently being considered for development; a very large (a billion tons or more) low-grade copper-gold-molybdenum resource has been outlined by drilling at Pebble Copper. The Kemuk deposit, located sixteen miles west of Koliganek, is a magmatic segregation deposit of iron and titanium hosted in a pyroxenite; an inferred resource of 2.4 billion tons is present. The Kemuk deposit has potential to contain platinum group metals. Nearby Sleitat Mountain contains a tin-tungsten-silver-bearing topaz-quartz greisen. An inferred resource of 29 million tons is indicated. It is anticipated that exploration activities will intensify on the large block of state lands in the north central portion of the planning area due to the perceived attractiveness of working on state-owned lands, especially during periods of rising metal prices.

The planning area, in general, has large quantities of sand, gravel, and quarry materials. There has been little need for these materials except in the vicinity of communities that require them for airport and road construction or upgrades.

There has been little study of the occurrence of the industrial rocks and minerals. Because the region contains a number of young volcanic rocks, zeolites, a group of minerals used as filter media and produced from the alteration of vitreous volcanic rocks, are abundant locally. Notable zeolite occurrences are found in the Lake Iliamna area. Asbestos minerals form from the alteration of olivine-rich ultramafic rocks. Potential for asbestos occurs wherever these ultramafic rocks are found, especially in the Goodnews mafic-ultramafic belt where some asbestos minerals have been identified.

## Goals

**Mineral Resources.** Make metallic and non-metallic minerals available to contribute to the mineral inventory and independence of the United States and Alaska.

**Economic Development.** Contribute to Alaska's economy by making subsurface resources available for development, which will provide job opportunities, stimulate economic growth, and establish a source of state revenue.

**Environmental Quality and Cultural Values.** Protect the integrity of the environment and affected cultures when developing subsurface resources.

**State Support of Mining.** Aid in the development of infrastructure such as ports, roads, railroads, and continue to provide geologic and geophysical mapping and technical support to the mining industry.

## Management Guidelines

**A. Access.** Access to and across public lands for mineral exploration and development is to be ensured. Land disposals and other authorizations are to be cognizant of access and road corridors proposed by the DNR and ADOT/PF and should not be allowed where such disposals or authorization would conflict with access considerations.

**B. Mineral Exploration.** By statute, exploration for locatable minerals is allowed on all state lands except those specifically closed to location. A land use permit is required under most circumstances. Hand prospecting and exploration activities which involve no significant surface disturbance generally do not require a permit. The DNR may determine that some forms of access will not be allowed in specific areas to avoid resource damage.

**C. Open to Mineral Location.** By statute, all state lands are open to mineral location unless specifically closed. Where an area is open to mineral location, a miner has the right to stake a mining location regardless of the surface use designation or classification. Any adverse effects of mining on surface resources or uses will be managed through compliance with state laws and regulations and borough ordinances and management intent and guidelines in this plan. Reclamation activities are regulated under the Mining Reclamation Act (AS 27.19) and state regulations (11 AAC 97).

**D. Mining in Fish Habitat.** When the DNR issues a permit for mining in or adjacent to a fish stream, conditions of the permit will require any necessary measures such as levees, berms, seasonal restriction, and settling ponds that will allow the operation to meet water quality standards, and statutes and regulations governing the protection of fish. Mining in fish streams requires permits from the ADEC and ADF&G. Such permits are not required in tide and submerged lands or estuarine areas outside of the intertidal channel exposed at mean low water. The intertidal channel is that portion of the bed and banks below the mean high water level. However, a Special Area Permit issued by ADF&G is required if the project is located within a legislatively designated area, including uplands, estuaries or tidelands.

**E. Offshore Prospecting Permits (OPP).** Under AS 38.05.250 an exclusive right to prospect for deposits of minerals offshore may be granted through authorizations issued by DNR. DNR determines what areas will be offered for offshore prospecting. No areas within the plan boundary are currently open for permits. If workable mineral deposits are found offshore, the permittee must apply for a lease in order to develop the mineral deposit. Units designated Habitat because of high fish or wildlife habitat values are areas of significant surface use by fish or wildlife. The ADF&G has stated that it has initially determined mining

in estuarine areas designated Habitat to be a nonconforming use under the ACMP<sup>20</sup>. The ACMP procedures will be used to determine whether mining can be made a conforming use and if mitigation is possible, impose the appropriate mitigating measures needed to protect fish and wildlife resources.

**F. Mineral Closing and Leasehold Location Orders.** No new mineral closing orders have been adopted as part of this plan. Users should check for any closure orders that may be in effect for areas in which they intend to work. One mineral closing order, adopted with the original (1984) Bristol Bay Area Plan closed a large number of streams to mineral entry; Mineral Closing Order 393 closed a large number of streams in the Nushagak-Mulchatna river drainage as well as some on the Alaska Peninsula. The 2005 BBAP inadvertently changed the designation of Habitat in the 1985 BBAP to another designation for certain streams. The 2013 BBAP revision corrects this unintended change and all streams, including their adjacent riparian area, are designated Habitat that are affected by this MCO<sup>21</sup>. A number of other mineral closing and opening orders affect settlement lands in the Dillingham, Aleknagik, and the Nunavaugaluk Lake area. Mineral Leasehold Location Order 1 affects large acreages of state land in the upper Mulchatna drainage as well as state lands around the eastern portion of Lake Iliamna. As of the date of this plan, the following mineral orders are in effect:

**Table 2.1: Mineral Closing, Opening, and Leasehold Location Orders**

<i>Mineral Order</i>	<i>General Vicinity</i>	<i>Acreage</i>
Mineral Closing Order 393	Nushagak-Mulchatna R. and AK Peninsula	213,697
Mineral Closing Order 562	Aniak River portion of this plan	-----
Mineral Closing Order 304	Nunavaugaluk Lake	2,360
Mineral Closing Order 305	Weary R.-Snake River Settlement Area	13,393
Mineral Closing Order 196	Warehouse Mountain Area	10,386
Mineral Closing Order 443	East Side of Aleknagik Road	2,368
Mineral Closing Order 570	Nelson Lagoon Reconveyance	3,840
Mineral Closing Order 249	Jack Rabbit Hills	22,831
Mineral Closing Order 552	Various University Lands in Alaska	N/A
Mineral Closing Order 754	Ekuk	5
Mineral Closing Order 650	King Cove	185
Mineral Closing Order 598	Balboa Bay (north of Sand Point)	52
Mineral Closing Order 644	Sand Point	59

<sup>20</sup> The Alaska Coastal Management Program was terminated on July 1, 2011, pursuant to AS 44.66.030.

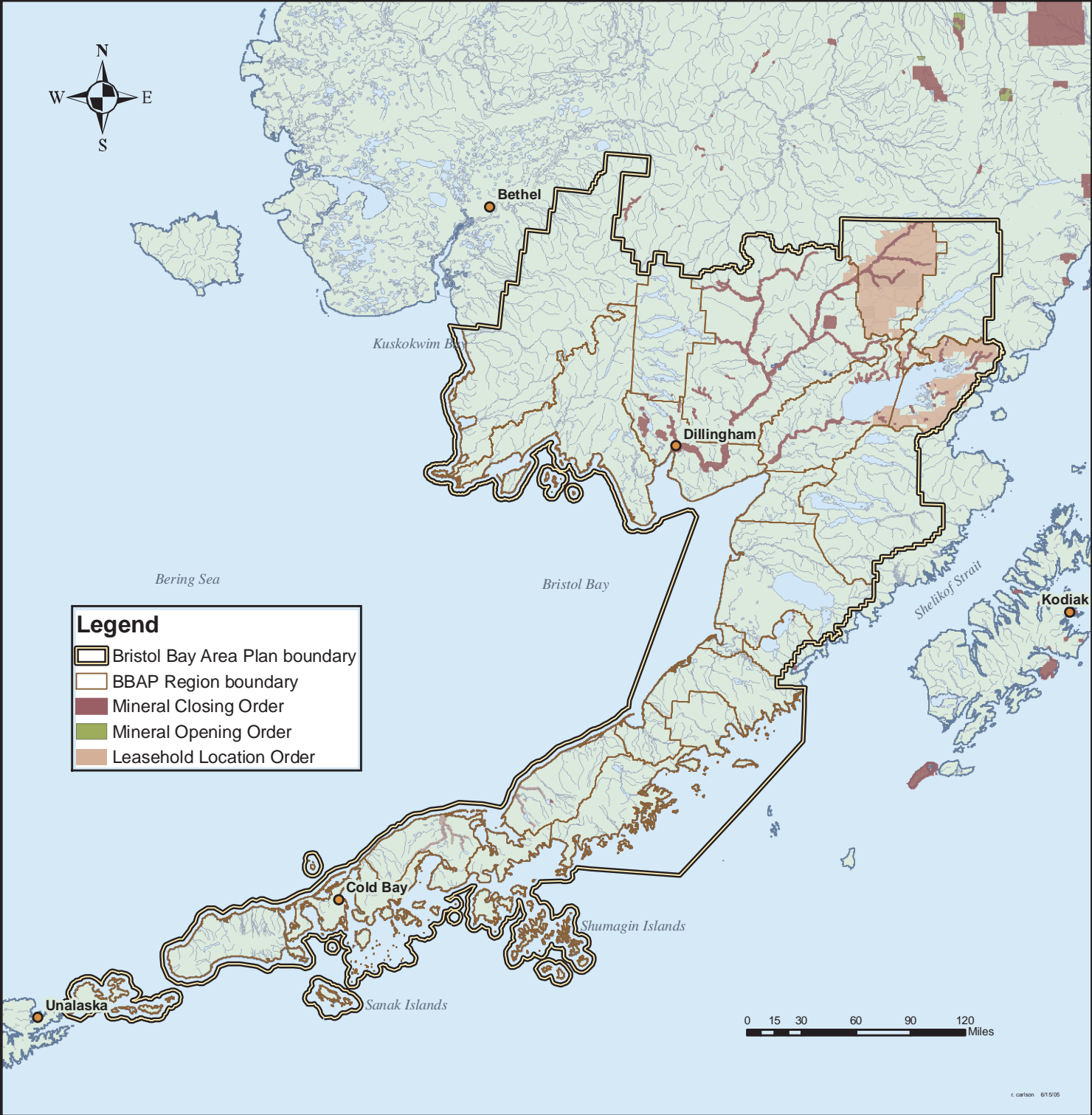
<sup>21</sup> Note to adjudicators: The riparian area affected by MCO 393 may be greater than 100'. Consult the case-file to determine the actual width. USGS quadrangle maps are included that indicate specific widths and these may be greater than 100'.

<i>Mineral Order</i>	<i>General Vicinity</i>	<i>Acreage</i>
Mineral Closing Order 622	Sand Point	2
Mineral Closing Order 521	Morzhovoi Bay	4
Mineral Closing Order 642	False Pass	27
Mineral Closing Order 239	North end of Upper Ugashik Lake (Univ.)	N/A
Mineral Closing Order 733	Egegik	3
Mineral Opening Order 702	Warehouse Mountain Area	1,112
Leasehold Location Order 1	Upper Mulchatna R.-East Iliamna Lake	1,920,327
Leasehold Location Order 6	Aniak River portion of this plan	-----

Leasehold Location Order 1 (1984) restricted mining over large areas of Regions 7, 8, and 9 to leasing. Rights to locatable minerals on lands owned by the State of Alaska are obtained by making a mineral discovery, staking the boundaries of the location, and recording the certificate of location in the designated time period. In most areas, such a location is a “mining claim”, which gives the owner an immediate property right to mine the deposits. However, in areas of the state that have been restricted to leasing, the location is a “leasehold location”, not a mining claim. The leasehold location must be converted to an upland mining lease before mining begins. No mining of minerals on leasehold locations may take place, except for limited amounts necessary for sampling or testing until a mining lease has been obtained. The leasing process includes the exclusive right to convert the leasehold location to a noncompetitive lease. There is no lease sale or open bidding.

**G. Coal Leasing.** Those lands that are currently available for coal leasing will continue to be available under this plan.

**Figure 2.2 Bristol Bay Area Plan - Mineral Closure Orders, Leasehold Location Orders, & Mineral Opening Orders**



**Figure 2.3. Bristol Bay Area Plan - Mineral Resources: Deposits, Prospects, and Occurrences**

